

Notice of Allowability	Application No.	Applicant(s)	
	09/842,809	SHIMIZU, HARUO	
	Examiner	Art Unit	
	Charlotte M Baker	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to an application for patent filed on 27 April 2001.
2. The allowed claim(s) is/are 1-24.
3. The drawings filed on 27 April 2001 are accepted by the Examiner.
4. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some*
 - c) None
 of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____.
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)
2. Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 01/31/2002
4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. Notice of Informal Patent Application (PTO-152)
6. Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. Examiner's Amendment/Comment
8. Examiner's Statement of Reasons for Allowance
9. Other _____.

Kimberly Williams
KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER

DETAILED ACTION

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Len Diana on November 5, 2004.

2. The application has been amended as follows: In the Abstract, p. 64, ln. 7, remove "in step S102"; p.64, ln. 8, remove "to step 103";
3. In the specification, p. 21, ln. 19, change "user using functions" to "user functions"; p. 34, ln. 15, change "and the a" to "and a"; p. 36, ln. 6, change "in case of" to "in the case of"; p. 37, ln. 24, change "when the input value equal" to "when the input value is equal"; p. 39, ln. 11, change "74 + 85 × 2 = 244" to "74 + (85 × 2) = 244".

Allowable Subject Matter

4. Claims 1-24 are allowed.
5. The following is an examiner's statement of reasons for allowance: claims 1-24 are allowed over the prior art of record because the Examiner found neither prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of said prior art which teaches
6. an image processing apparatus comprising:
means for determining if the density information is offset to a specific color;

means for, when it is determined that the density information is offset to a specific color; means for, when the density information is offset to the specific color, reducing a gradation level of colors other than the specific color.

Nakamura et al. (6,731,400) disclose a color image processing apparatus which is capable of accepting a color page description language input, analysis of luminance information, and performance of luminance to density conversion, but fails to specifically address the determination of density offset to a specific color.

Shirasawa et al. (5,689,590) disclose a background noise removing apparatus and percentage of densities, but fail to specifically address determination of density offset to a specific color.

7. an information processing apparatus connected to color recording means, said apparatus comprising:

means for converting the first color information into second color information as a color space of the color recording means by executing a gradation level reduction process of colors not more than a predetermined level with the color recording means being able to generate an image with a light amount not more than an invisible, non-developing level.

Neither Nakamura et al. nor Shirasawa et al. disclose a color recording means able to generate an image as described in the claim language. The purpose of the output information with a light amount at an invisible or non-developing level is for elimination of white gaps as described by the applicant in the abstract. Elimination of white gaps is not disclosed by either prior art reference.

8. an image processing method comprising the step of:

determining if the density information is offset to a specific color;
gradating the specific color when it is determined that the density information is offset to a specific color;
reducing a gradation level of colors other than the specific color when the density information is offset to the specific color.

Neither Nakamura et al. nor Shirasawa et al. disclose an apparatus that performs determination of density offset to a specific color; therefore, the apparatus disclosed in the prior art references (number 5) cannot perform the method steps (number 7).

9. a method for information processing apparatus connected to a color recording means, comprising the step of:
converting the first color information into second color information as a color space of the color recording means by executing a gradation level reduction process of colors not more than a predetermined level with the color recording means being able to generate an image with a light amount not more than an invisible, non-developing level.
Neither Nakamura et al. nor Shirasawa et al. disclose an apparatus that performs generating an image with a light amount not more than an invisible, non-developing level; therefore, the apparatus disclosed in the prior art references (number 6) cannot perform the method steps (number 8).
10. a computer program product comprising a computer readable medium having computer program code, for executing an image process, said product including:
determination process procedure codes for determining if the density information is offset to a specific color ;

gradating process procedure codes for gradating the specific color when it is determined that the density information if offset to a specific color;
gradation level reduction process procedure codes for executing a gradation level reduction process of colors other than the specific color when the density information is offset to the specific color.

Nakamura et al. disclose a PC capable of containing a computer readable medium with program code. As addressed above in number 5, neither prior art reference addresses determination of density offset to a specific color; therefore, the computer readable medium with program code capable of performing the determination process is also not addressed.

11. a computer program product comprising a computer readable medium having computer program code, for executing an information process, said product including:
conversion process procedure codes for converting the first color information into second color information as a color space of the color recording means by executing a gradation level reduction process of colors not more than a predetermined level with the color recording means being able to generate an image with a light amount not more than an invisible, non-developing level.

Nakamura et al. disclose a PC capable of containing a computer readable medium having computer program code. As addressed in number 6, neither Nakamura et al. nor Shirasawa et al. disclose a color recording means able to generate an image with as described in the claim language; therefore, the computer readable medium with program

code capable of performing the conversion process as outlined in the claim language is also not addressed.

12. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charlotte M Baker whose telephone number is (703) 306-3456. The examiner can normally be reached on Monday-Friday 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly A Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, DC 20231

or faxed to:

(703)872-9314 (for Technology 2600 only).

Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive (Sixth Floor Receptionist)
Arlington, VA

KAWilliams

KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER

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ABSTRACT OF THE DISCLOSURE

This disclosure relates to an image processing system which can eliminate white gaps which are highly likely to be generated in, e.g., a non-contact color developing system by a simple arrangement, and can output a high-quality image.

If it is determined in step S102 that a white gap process is required, the flow advances to step S103 to check if the converted data indicates a primary color (single color). Other colors undergo a gradation level reduction process, and a laser is minimally and uniformly turned on (background exposure) at a level which is imperceptible to the human eye by always setting level 1 (data of minimum, invisible level) so as to generate output information with a light amount at an invisible or non-developing level or less, thereby eliminating white gaps.

Furthermore, upon receiving a GDI rendering command, and a background exposure color command and gradating command which are particularly related to this embodiment, the printer driver 2022 requests a 5 processing service of a color adjustment module 2024 and Color Management System (CMS) module 2023.

The spool subsystem 2030 is a subsystem located behind the graphic subsystem 2020, and is unique to a printer device. This spool subsystem 2030 comprises 10 spool file 1 (2031) as a first data storage means, and a process monitor 2034 for reading out PDL codes stored in the spool file, and monitoring the progress of processes in the printer 1501. Note that the first data storage means can be implemented by a storage device such as a 15 hard disk or the like.

The UI processor 2040 displays various menu buttons, and analyzes user actions. The UI processor 2040 determines print quality control parameters for the UIB 20 user ~~using~~ functions provided by the OS on the basis of 20 the analysis result.

The names and functional mechanisms of the aforementioned modules may differ depending on basic OSs, but such differences are not essential. Therefore, the present invention can be applied to any other modules as 25 long as they can implement technical means of this embodiment.

background exposure (white gap process) mode listed in parentheses are selected.

The user who is not satisfied with these default setups can press a manual setup button 905 to 5 independently designate an arbitrary combination of a color matching process, gradating mode, background exposure (white gap process) mode, and gray compensation mode. Fig. 16 shows an example of the manual setup. In the manual setup, the user can select desired processes 10 using combo box menus 907, 908, 910, and 913 of color matching, gradating, gray compensation, and background exposure (white gap process), as shown, e.g., in Fig. 16.

In the manual setup menu of this embodiment, when the user presses an arrow mark at the right end, a list of processes the system supports is displayed, and the a desired process is set in response to the next mouse clicking as a trigger. Selectable setup quality parameters are listed below the menus 907, 908, 910, and 913.

20 When the user finally presses an OK button 905, the printer driver 2022 determines color matching setup information, and gradating, gray compensation, and white gap process methods in units of objects.

More specifically, information designated by the 25 user is set in each of corresponding flags CMS_image_flag, CMS_text_flag, CMG_graphics_flag, GT_image_flag, GT_text_flag, GT_graphics_flag,

After the conversion result is obtained, the flow advances to step S6, and the printer driver 2022 converts the obtained converted color information into ^{the} PDL commands. In ^{the} case of a text or graphics object, one color space compression process is executed per object. However, in case of an image object, since one object holds a plurality of color data, color sequence information is passed to the CMS module 2023 to undergo a batch process. As a result, the processing efficiency can be improved.

In the default setup, the background exposure (white gap process) mode is ON for text and graphics objects, and is OFF for an image object. When the automatic or semi-automatic button 901, 902, or 903 is selected on the print quality setup panel (900), a white gap process command corresponding to each object is converted into a PDL command in units of objects in step S7.

If the manual setup button (905) is ON, the setup (ON or OFF) of a white gap process (913) on an individual setup panel (911) is checked, and the value of this setup 913 is converted into a PDL command for all objects (graphics, text, image).

It is checked in step S8 if the process for one page is complete. If NO in step S8, the flow returns to step S5 to repeat the color space compression process

and white gap process of the rendering object of interest.

Upon completion of the rendering process for one page, the processing for one page ends. Upon processing 5 the next page, the processing is executed again.

[Description of Basic Operation of Printer Side]

The basic operation on the printer 1501 side in this embodiment will be described below. Note that a description of an outline of the processes in the 10 printer engine 1100 will be omitted since it has already been explained above, and gradating (especially, dithering), and background exposure (white gap process) as processes unique to this embodiment will be mainly explained below.

15 [Dithering]

To explain dithering, an example of a simple multi-value conversion algorithm for converting an 8-bit (256-level) multi-valued input into 2-bit (4-valued) data will be described below.

20 In this embodiment, as shown in Fig. 17, when the input value of the pixel of interest is less than 64 (area 0), 0 (00) is output; when the input value is equal to or larger than 64 and is less than 128 (area 1), 85 (01) is output; when the input value ^{IS} equal to or 25 larger than 128 (inclusive) and is less than 192 (area 2), 170 (10) is output; and when the input value is

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(a) The pixel of interest on input data is read, and the area to which that pixel belongs is checked. For example, when input data is as shown in Fig. 18, the pixel of interest is "180", and belongs to area 2, as 5 shown in Fig. 17.

(b) Corresponding dither matrix values are read, and the threshold value is changed to a value that matches this area. For example, if corresponding dither matrix values are 74, 85, and 85, the threshold value is 10 given by:

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$$\text{Threshold value} = 74 + (85 \times 2) = 244$$

(c) If the data of the pixel of interest is equal to or larger than the threshold value, the maximum value of the area is determined to be an output value; if it 15 is less than the threshold value, the minimum value of the area is determined to be an output value.

Since pixel of interest (180) < threshold value (244), a minimum value (170) of area 2 is output.

(d) The next pixel is processed.
20 If the aforementioned process is implemented by hardware, high-speed conversion can be made using a look-up table. This table can be realized by pre-storing 2-bit output values obtained by dither-converting input levels ranging from 0 to 255 at 25 respective positions of a 4×4 dither matrix.

The table size in this case requires $256 \times 4 \times 4 \times 2$ bits = 1024 bytes for each of Y, M, C, and K, and 2